

REMARKS

By the present amendment, claims 12 - 14, which were submitted with the Amendment of December 12, 2008, and are present in PAIR, have been written in independent form incorporating all of the limitations of the respective base claim therein. Applicants note that the Office Action of March 3, 2009 provides no rejection of claims 12 - 14, and applicants therefore submit that claims 12 - 14 are in condition for allowance so that the claims have been written in independent form. A specific indication of allowance of claims 12 - 14 is requested.

As to the rejection of claims 1 - 8, 10 and 11 under 35 USC 103(a) as being unpatentable over Nix et al (US 7,037,269 B2) in view of Brommersma (US 5,351,691), and further in view of Kimura et al (JP 11305143 A), and the rejection of claim 9 under 35 USC 103(a) being unpatentable over Nix et al (US 7,037,269 B2) in view of Brommersma (US 5,351,691), and further in view of Kimura et al (JP 11305143 A), and further in view of Holdaway et al (US 2001/0047134 A1), such rejections are traversed and reconsideration and withdrawal of the rejections are respectfully requested.

Applicants note that each of independent claims 1 and 11 recite the features of a flexible circuit board of at least one layer in which signal lines are installed, and:

wherein the flexible circuit board has slits dividing signal lines of the flexible circuit board into a plurality of sections of the flexible circuit board and each section of the flexible circuit board which is divided by at least one of the slits of the flexible circuit board is separately spirally wound (emphasis added).

The aforementioned features as well as the other features of independent claims 1 and 11 are now incorporated into rewritten independent claims 12 - 14.

In applying Nix et al to independent claims 1 and 11, and in particular, with respect to the features as set forth above, the Examiner contends:

... the flexible circuit board has slits (the flexible circuit board must have areas of non-conduction in order to separate the different signal lines) dividing the signal lines into sections of each of said positions at a predetermined angle and each section of the flexible circuit board divided by the splits is separately wound (col. 4, lines 32 - 34; Fig. 6a)... (emphasis added).

Irrespective of the Examiner's interpretation of Nix et al, Nix et al describes in column 3, lines 52 - 56 that "The ultrasonic transducer array 3 is provided with electrical power by means of a ribbon cable 22 which runs the length of the catheter, the proximal end of the ribbon cable being connected to an electrical supply and control arrangement (not shown) which itself is not part of the present invention. (emphasis added). Further, as describes at column 4, lines 28 - 34, "The multiplexer units 5a, 5b, 5c and 5d are electrically connected to the transducer array 3 by means of a flexible circuit indicated at 12. Thus flexible circuit 12 is arranged in a helical configuration and it passes from the transducer 3 to the multiplexer units 5 through the balloon device 2". (emphasis added). Further, referring to Figs. 4A - 4E, and as described in column 5, lines 11 - 19, "As can be seen from these cross-sections, the ribbon cable 22 consists of a number of electrical leads which were most of its length are molded together to form the unit shown in Figs. 4A, 4B and 4C. However, at the point where it is required to connect electrically, the various constituents of the ribbon cable to the four multiplexer units 5 the ribbon cable 22 is split into discrete leads as shown in Fig. 4D. These leads are then connected to the respective multiplexer units via tracks on the flex circuit." (emphasis added). As shown in Figs. 4D and 4E, the ribbon cable 22 or leads thereof are separate from the flex circuit 12, and contrary to the Examiner's position, assuming arguendo that the flex circuit 12 represents a flexible circuit board, the flex circuit 12 does not have slits, which are defined in Webster's New Collegiate Dictionary as "a long narrow cut or opening". Applicants submit that areas of non-conduction in Nix et al do not represent slits of a

flexible circuit board, as recited in independent claims 1 and 11 and the dependent claims thereof. Further, applicants submit that there is no disclosure or teaching in Nix et al that the slits of the flexible circuit board divide the flexible circuit board into sections, each of which is spirally wound. While Fig. 6B of Nix et al illustrates a spirally or helically wound flex circuit 12, such represents a single flex circuit wound in the manner indicated, such that it is apparent, that while the Examiner mischaracterizes the disclosure of Nix et al, while utilizing the claim language, such is an improper characterization of the actual disclosure and teachings of Nix et al. Thus, applicants submit that claims 1 and 11 patentably distinguish over Nix et al with regard to the aforementioned features.

The Examiner recognizes that Nix et al does not teach the flexible circuit having two sections joined at a predetermined angle. In fact, it is not apparent that Nix et al teaches a flexible circuit board of at least one layer and in which signal lines are installed, which signal lines are divided into sections by slits of the flexible circuit board. The Examiner recognizing the deficiency of Nix et al with respect to a flexible circuit board having two sections joined at a predetermined angle, cites Brommersma for this purpose. Applicants note that independent claims 1 and 11 do not refer to “two sections joined at a predetermined angle (emphasis added), as referred to by the Examiner, but rather recite that the “flexible circuit board includes a first part which extends from the transducer unit in the longitudinal direction of the plurality of transducers and a second part which is connected to the first part and extends at a predetermined angle with respect to the longitudinal direction extension of the first part so as to form a bend at the predetermined angle with respect to the first part”. (emphasis added). Assuming, arguendo that Brommersma discloses a flexible circuit board having first and second parts forming a bend at the

predetermined angle, it is readily apparent that while the flexible circuit board of Brommersma has signal lines installed therein, wherein Fig. 6 of Brommersma illustrates conductor tracks extending in the longitudinal direction of the elongated parts 60 and 61 of the wing strips 34, 35 of the flexible printed circuit board being divided into groups 70, 71 and 72, 73, respectively, each line on one side of the folding line 74 and 75, respectively, it is apparent that the flexible circuit board of Brommersma also does not have slits dividing the signal lines of the flexible circuit board into sections, wherein each of the sections is separately spirally wound, as recited in each of independent claims 1 and 11, and the dependent claims thereof. Thus, applicants submit that all claims patentably distinguish over this proposed combination of references in the sense of 35 USC 103 and all claims should be considered allowable thereover.

The Examiner recognizes that “Nix et al and Brommersma teach the limitations as discussed above but fail to explicitly teach the flexible circuit board having a plurality of sections which are separately wound.” (emphasis added). The Examiner cites Kimura et al as teaching a “flexible board being divided into sections in which each of the sections are separately spirally wound (see Fig. 4; Para [0020] - [Par 0027]) (emphasis added). Assuming arguendo, Fig. 3 of Kimura et al shows spiral winding of an entire flexible board without slits, and that Fig. 4 of Kimura et al shows a flexible board being divided into sections, applicants submit that it is apparent from Fig. 4 of Kimura et al while the sections may be twisted with one another, the sections are not separately spirally wound. Furthermore, applicants submit that the Examiner has engaged in a hindsight reconstruction attempt noting that Nix et al, which was filed in 2001, apparently had access to the teachings of Brommersma which issued in 1994, and Kimura et al, published in 1999, and did not

utilize the teachings thereof. Thus, applicants submit that independent claims 1 and 11 and the dependent claims recite features which patentably distinguish over this proposed combination of references in the sense of 35 USC 103 and all claims should be considered allowable thereover.

With respect to the features of dependent claims 2 - 8 and 10, applicants submit that such dependent claims recite further features of the present invention which are not disclosed or taught in the cited art and the Examiner has further mischaracterized the disclosures of the cited art in relation to such claimed features. Thus, applicants submit that these dependent claims, when considered in conjunction with the parent claims, further patentably distinguish over the cited art, and should be considered allowable thereover.

As to the rejection of claim 9 based upon the aforementioned combination of references further in view of Holdaway et al, the Examiner recognizes that Nix et al, Brommersma and Kimura et al do not disclose or teach separate layers of the flexible circuit board for ground and signal. In fact, as pointed out above, such feature is contrary to the disclosure of Nix et al. Irrespective of whether Holdaway et al teach separate layers for ground and signal, it is readily apparent that such features of claim 9, when considered in conjunction with parent claim 1 fail to overcome the deficiencies of the other cited art with respect to parent claim 1. Accordingly, applicants submit that claim 9 also recites features, which when considered in conjunction with parent claim 1 and dependent claim 2, further patentably distinguish over the cited art and claim 9 should also be considered allowable.

In view of the above amendments and remarks, applicants submit that all claims present in this application should now be in condition for allowance, and issuance of an action of a favorable nature is courteously solicited.

To the extent necessary, applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in the fees due in connection with the filing of this paper, including extension of time fees, to the deposit account of Antonelli, Terry, Stout & Kraus, LLP, Deposit Account No. 01-2135 (Case: 529.44217X00), and please credit any excess fees to such deposit account.

Respectfully submitted,

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